DFSC
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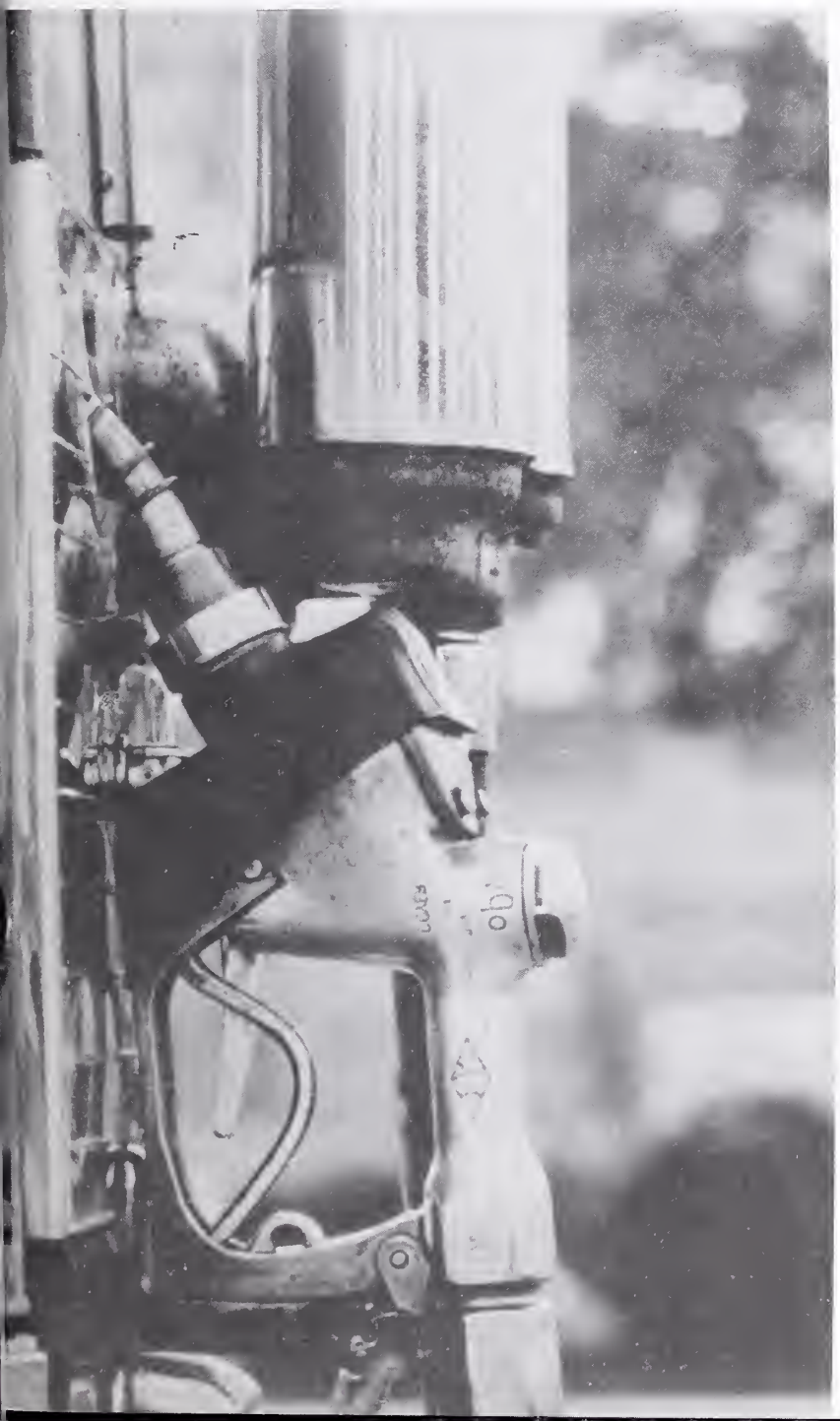

HOW HIGH IN 1980?

DFSC FUEL LINE

A DEFENSE FUEL SUPPLY CENTER
TECHNICAL PUBLICATION

JANUARY 1980

FUEL LINE is an official technical publication, published quarterly by and for Defense Fuel Supply Center and fuel oriented clientele. FUEL LINE is designed to provide timely, factual information on policies, plans, operations and technical developments of Defense Fuel Supply Center and other interrelated subject matter. Views and opinions expressed in the FUEL LINE are not necessarily those of the Department of Defense. All inquires should be addressed to: Defense Fuel Supply Center, Editor, FUEL LINE, Public Affairs Office (AP), Cameron Station, Alexandria, Virginia, 22314. Telephone: (202) 274-6489.

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Petroleum Procurement Trends and Challenges

Captain O.W. Hamilton, Jr., SC,USN
Deputy Commander
Defense Fuel Supply Center

Although the turbulence in the petroleum market shows some signs of moderating, it's fragile structure threatens the economic stability of the Western industrial nations. The situation in Iran exemplifies this. The Defense Fuel Supply Center continues to experience procurement shortfalls and price escalations that are having a major impact on our operations. In this article I am going to discuss some of our challenges in relationship to the world petroleum market, DoD's petroleum procurement procedures, and the future.

During the period from the Arab Oil Embargo of late 1973 to the beginning of the Iranian situation in the fall of 1978, world petroleum markets were relatively stable. Crude oil was readily available, and there were several periods during which the crude oil supply on the world market was significantly in excess of demand.

Between March 1978 and March 1979, however, the crude oil market underwent a complete reversal. The crude oil glut of 1977 and the first half of 1978 evaporated as buyers stockpiled oil prior to the anticipated January 1979 OPEC price hike. Then, with the market in a normal pre-OPEC meeting status, developments in Iran grew progressively more critical. By the end of December 1978, Iranian exports were totally cut off--a cutoff which did not end until early March 1979.

The impact of the first quarter 1979 oil market of a cutoff of some 5,000,000 b/d of Iranian crude oil was softened to some extent by increased production from other sources, notably Saudi Arabia. Nevertheless, the net effect of the cutoff on the world oil market was estimated to be a shortfall of about 2,000,000 b/d below demand for current needs and inventory rebuilding.

Perhaps the most significant impact of the upheaval in Iran and the resulting disruption of petroleum supplies was the drastic and widespread change it brought about in traditional international trading patterns. Supply interruptions and distortions in the crude oil production areas affect all levels of the distribution cycle--production, refining, and movement. When crude oil supply sources are lost or do not meet requirements, refiners and integrated oil companies usually make up their shortages through spot market purchases. There was a dramatic upsurge in spot market activity after the Iranian cutoff as refiners scrambled to replace crude supplies lost as a direct or indirect consequence of reduced Iranian crude oil production.

Prior to the Iranian revolution, the oil companies making up the Iranian consortium enjoyed the exclusive right to sell Iranian crude on the world market. The quantity of crude available to major oil companies before the shake-up in Iran was well in

excess of the requirements of their refining affiliates. In fact, a surplus of about 3½ million b/d was available for sale outside of the integrated system of the majors.

The cessation of exports from Iran at the end of 1978 deprived the majors of a quantity roughly equivalent to their aggregate net surplus. BP, with its 40 percent stake in the consortium, was hit hardest. Normal trading patterns were interrupted and, in many cases, abandoned.

To cite an example, BP was obliged to invoke force majeure provisions and was unable to satisfy contractual agreements with other companies, including Exxon, which in turn decided on a phased-down withdrawal from all its third-party crude-oil contracts--a total of 400,000 b/d.

BP suspended all third-party, crude-oil contracts after Nigeria nationalized petroleum assets in August of this year.

It is also important to realize that the control of crude oil has been shifting gradually from the international majors to the governments of exporting countries. It is a process that began in the early 1970's and is still unfolding.

Iran's gradual resumption of exports in March was handled by the National Iranian Oil Company. Almost overnight, twenty-year contracts with consortium members were abrogated. As a result, refiners, including many important majors, were forced to turn to the spot market for needed supplies.

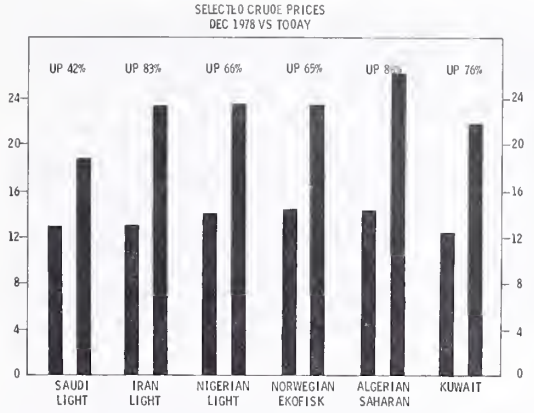
As spot-market activity increased, disruptive effects spread through the entire refining industry.

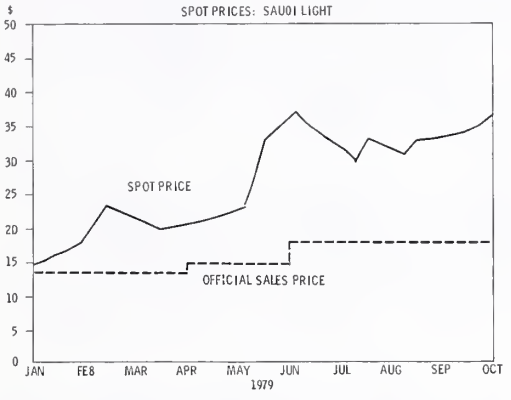
Small, crude-short refiners who lacked access to contract crude supplies were forced out of the market by high spot prices and competition from the majors for available spot volumes. Small refiners were particularly hard hit since many of them lack access to lower priced, long-term, contract crude and are more dependent upon spot purchases. They are literally priced out of the market because they are unable to average in high-priced spot volumes with lower priced contract volumes. Spot-market prices in recent months have increased to levels previously considered impossible. For example, spot-market prices are now $10 to $20 above the $26.27 official sales price for high-quality Nigerian crudes.

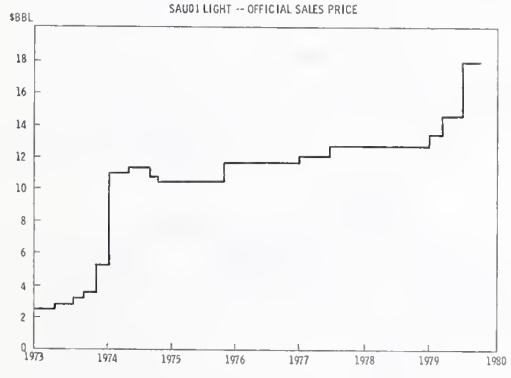
The refiners' position has been further complicated by difficulty in obtaining the right kind of crude to conform with specific refinery configurations. Many small refiners require light crude and are unable to process heavy crudes.

In recent years, small refiners have been our major source of supply. Now, most of them lack a secure source of crude and are having to buy on the spot market or not supply.

Spot market trends influenced OPEC to reevaluate their official pricing strategy. They took into account the willingness of spot buyers to pay prices well above official price levels, the inelasticity of overall petroleum demand, and the general worldwide dependence on petroleum. As a result, OPEC official prices have increased more than 60 percent this year. Most OPEC crudes carry significant surcharges or premiums above the official price of Saudi Arabian light, the marker crude at $18.00/bbl.



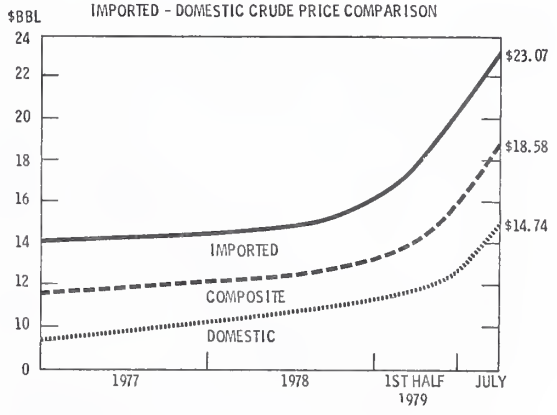




For the present, price hikes well above the Saudi marker level by most OPEC members have prompted most market analysts to consider the Saudi price of $18 a bargain in today's market. This could signal a continuing upward trend in official OPEC price levels. Gradual increases occurred in the official selling price of Saudi light crude between 1973 and the third quarter, 1979, and took sharp upward turns in 1974 and 1979.

Despite recent moves toward decontrol in the United States, the differential between U.S. crude and imported crude continues to grow. In July, huge OPEC price increases pushed the cost of crude oil imports to the U.S. $8.33 a barrel above domestic prices. That is more than double the $3.88 price difference between domestic and imported oil in late 1978.

The administration's energy program calls for full decontrol of domestic crude by October 1981. The intent is to stimulate domestic exploration and tertiary recovery efforts by allowing domestic crude to be sold at world market price. The impact on U.S. consumers will be continuing and steady price increases over the next two years.



This price rise will occur independent of future OPEC pricing actions.

On a more optimistic note, the higher prices consumers are paying for fuel are helping to restore some balance to the world petroleum market in terms of supply, demand, and inventories. Production cutbacks by some OPEC members have been largely offset by the Saudi increase of 1,000,000 b/d. Consumption in the U.S. has been cut by about 1 percent, a reduction that is due to a combination of actual product shortage, in the case of gasoline, and cross-price elasticity in the case of fuel oil, where consumers are converting to natural gas at unprecedented rates.

The commercial inventory picture is improving in most areas. In the U.S., the administration's target of 240 million bbls for heating oil inventories has been met. Stocks at tertiary and secondary levels are also improving, but are running behind levels of a year ago.

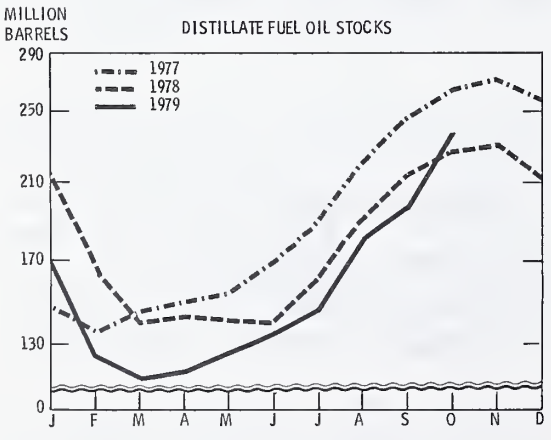
All in all, the distillate supply picture in the U.S. looks good for the approaching winter. Stock levels for other products in the U.S. are also reasonably good. Gasoline stocks, for example, are about 6½ million bbls above last year's levels.

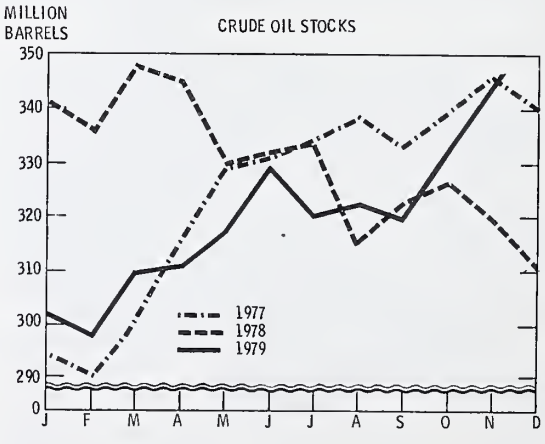
In Europe, as well as in the United States, indications are that industry stock levels are gradually improving. The latest data show that distillate stocks are comparable to the levels of a year ago.

During the past several months, European refiners maximized distillate production--a strategy which resulted in a gasoline supply crunch. It is generally believed, however, that gasoline stocks in Europe are sufficient to eliminate shortages at least through the winter.

With these promising indications in the commercial market, I would like to be able to tell you that DoD's inventory levels are taking a comparable upturn. Unfortunately, our inventory picture is not very good.

Many of our most preplexing problems involve the reluctance of suppliers to bid on our requirements because of all the government red tape. They are





unhappy about the lack of contractor price protection in our contracts, the inordinate length of time it takes for us to award a contract when they do bid, and the length of time it takes us to pay our bills.

On the other side of the coin, DFSC is frequently hampered by the fact that many of the bids we receive are priced above the market range.

In too many cases, we have had to compensate for insufficient ground-fuel contract coverage by authorizing local purchases at base level or by making shipments from a Defense Fuel Support Point.

To counteract these shortages, DFSC has initiated a number of actions:

- We have increased the frequency with which solicitations open and close for uncovered program requirements.

- The DFSC Director has written personal letters to petroleum company executives and telephoned many of them.

- The DFSC Director and Deputy Director have personally visited major oil companies such as Exxon, Gulf, Mobil, Hess, Agip, and Shell and conferred with their senior officials--chairmen of the board, presidents, and vice presidents.

- We have asked the Department of Energy to contact major suppliers and encourage them to offer additional jet fuel and distillates to satisfy military requirements.

These communications have had some positive effect. DFSC received a large supplemental offer of JP-4 from Mobil Oil, a supplemental offer from Exxon, and awarded a major contract to Amerada Hess. In addition, there is significant improvement in our JP-4 and DFM offers from European suppliers.

At DoD's request, an ad hoc group has been established by DLA and DFSC to critically examine contracting procedures. The goal of this group is to identify changes that will enhance our ability to perform our mission in a supplier's market.

Suppliers have identified major areas of concern that require attention; for example, the size and complexity of our solicitations and contracts; the inclusion of contract clauses that are required by regulation but are incidental to buying petroleum products; delays in payment; and the use of military specifications for what are basically commercial products.

In our initial efforts to eliminate these problem areas and increase the volume of product offered:

- We have reviewed our present solicitation packages to simplify them, and identified those solicitation provisions that we do not consider essential for purchasing petroleum products. To this end, we have prepared model solicitations for overseas and domestic bulk and ground fuels requirements. For example, the overseas solicitation package was reduced from some 80 to about 40 pages. We have a way to go!

- We have held meetings with the Army, Navy, and Air Force to determine what actions are necessary to speed up payments.

- On a test basis, we have included provisions in our present domestic ground fuels solicitation

permitting contractors the right to allocate product to the government if the contractors' supplies are allocated, and to base price escalations on postings of the contractor's major suppliers.

- We are also pursuing the use of long-term or multi-year contracting for bulk fuels.

Looking to the future, DFSC is planning to:

- Rewrite our clauses to consolidate and simplify information.

- Review specification requirements with our customers with the goal of using commercial specifications to the greatest possible extent.

- Analyze our contract review and approval procedures to streamline the contracting process and shorten the time between offer and award.

Dealing with the future is always risky; more so the future of the petroleum market. Although the worldwide oil shortage has begun to recede, the emerging balance between world oil supply and demand is shaky. It could easily be upset by political forces in the Middle East or unusually severe winter conditions in the U.S. and Europe.

The recent CIA study, "The World Oil Market in the Years Ahead," underscores its basic instability. The CIA analysis concludes that the oil-consuming nations will be increasingly vulnerable to unpredictable oil supply interruptions in the early 1980's and a recent Library of Congress study says that the Warsaw Pack nations will become oil importers in the mid 80's.

Current consumption, and short term consumption forecasts, show that new discoveries are not keeping pace with demand. Output is expected to fall in the decade ahead. Stagnating production and OPEC marketing strategy will act to hold down supply availability. Production increases outside of OPEC are expected to be absorbed primarily by Third-World developing nations.

Nevertheless, barring unforeseen negative developments, a continued improvement in the near term oil supply and demand balance can be anticipated. If OPEC maintains current production at about 31 million bbls, Western oil supplies will be adequate and stocks at year-end will be slightly higher than at the end of 1978.

Western consumption in the second half of 1979 should show very little increase over a year ago. Much of the current production is serving to build up stocks. Actual U.S. consumption is expected to be down by about 1 percent, reflecting both the physical constraint on gasoline supply in the third quarter as well as some economic slow down.

For 1980, most economists expect the U.S. gross national product to decline and the GNP's of Europe and Japan to grow at slower rates. U.S. oil demand is expected to drop by about .5 percent and total non-communist demand will grow by about .6 percent.

DFSC is dealing in a suppliers market and that is not likely to change. Consequently, we must move to adapt our ways of doing business with the real world.■

DFR-E Personnel Awarded

Mike McCoid receives a Suggestion Award Certificate from BGen Seamon.

Mike McCoid

On a recent visit to DFR Europe, BGen L. R. Seamon, the Commander of DFSC, presented a Suggestion Award Certificate to Michael J. McCoid, DFR-E contracting officer. Mike's recommendation was that picnic tables be installed at various locations on Patch Barracks to give "brown baggers" a place to eat lunch other than at their desks. It turns out that the tables are quite extensively used.

Fred Lastra

BGen Seamon's visits to various locations within DFR-E afforded him an opportunity to get acquainted with many of the quality assurance representatives. While in London, he presented Fred P. Lastra, DFQAR, High Wycombe, England, with a certificate for Outstanding Performance.

Fred represented DFSC as one of the top ten DLA outstanding QAR's this year. He plans to return to DFSC Headquarters, Directorate of Technical Operations, early in 1980. If all goes well, the move home will cost the government twice as much as anticipated, for Fred will return with his new bride. In the future it will be much harder to convince the DFSC Comptroller that a QAR's job is all work and no play.

Outstanding performer Fred Lastra, left, is congratulated by General Seamon.

Crude Prices to Soar Again in 1980

International Petroleum Times

The shaky agreement on export oil prices reached by the thirteen OPEC member countries at Geneva in July has collasped. Since the beginning of October Iran, Iraq, Nigeria, Libya, and Algeria, have all unilaterally increased prices. So to have Oman and Mexico but they are not OPEC members.

The key price rises in OPEC member states have been those of Libya and Algeria which have butted beyond the $23.50/bbl ceiling set at Geneva. Their new prices have now reached a world record for contract oil of $26.27/bbl.

It was not the North African producers, Libya and Algeria, who started the price spiral this time. It was Kuwait and Iran. The others followed suit only after they were sure consumers would accept the new price limits set by Iran and Kuwait.

Over the last several months, Iran and Kuwait have watched spot prices hover below and above $35/bbl. A few spot loads were sold at more than $40/bbl.

Simultaneously along with other OPEC countries, they were acutely aware of the eroding value of the U.S. dollar against other world currencies. They also observed that companies were taking all their permitted liftings and were ready to take more at the new high prices set at Geneva. Both countries made a reasoned assessment of demand and the market. They then boosted prices to the OPEC ceiling but not beyond it. It was left to the Algerians and Libyans to go through the OPEC barrier. Once Iran and Kuwait had made their move, Algerian and Libyan action was both logical and inevitable. The light, low sulphur crudes of North Africa by the application of OPEC's agreed price differential formula have always been more highly priced than the crude of the Gulf. If 36° API crude from Iraq was to be priced at $23.50/bbl--OPEC ceiling price--North African crudes would have to be more highly priced. Hence the decisions of Libya and Algeria.

These new North African prices are already having an effect on North Sea prices. Within weeks North Sea oil is expected to reach the new North African limit.

And so to Caracas. Sheik Ahmed Zaki Yamani giving the moderate view of Saudi Arabia, gave the opinion that "things had gotten out of control." A number of well known pundits are forecasting the end of OPEC as the domino effect of the Kuwaiti-Iranian price action raised prices throughout the OPEC world.

When OPEC members met in Caracas on December 17 they were faced with three major decisions: Whether or not to continue a unified export pricing policy for oil; whether to remain with the U.S. dollar as a base for oil payments; and whether there is a need to establish an OPEC pricing formula for gas.

OPEC countries unilaterally are going for what prices they think the market will bear. There is no sign of cut back in demand in

the consumer world. Current world consumption is running at a record 63 million b/d. Only a major world recession will cause oil prices to ease. Overall effect of that would be a drastic fall in the value of the foreign investments of OPEC countries.

Oil companies and the consuming countries are dislocated by the random price increases of OPEC member states. Representatives of both are yearning for the idyllic days of a strong, moderate, unified OPEC. ■

Country	Crude	°API	Jan 77	Jan 78	Dec 78	Jan 79	Apr 79	Jun 79	Jul 79	Oct 79	Nov 79
Abu Dhabi	Zakum	40°	12.42	13.17	13.17	14.01	17.01	17.81	21.46	21.46	21.46
	Murban	39°	12.50	13.26	13.26	14.10	17.10	17.90	21.56	21.56	21.56
	Umm Shaiff	37°	12.28	13.04	13.04	13.78	16.88	17.68	21.36	21.36	21.36
Algeria	Blend	44°	14.30	14.25	14.10	14.73	18.55	21.00	23.50	23.50	26.27
Angola	–	–	–	–	–	–	–	18.03	21.04	–	–
Gabon	Mandji	–	–	–	–	–	–	–	16.00	20.00	20.00
Ecuador	Oriente	–	–	–	–	–	–	–	26.80	–	–
Indonesia	Sumatran Light	35°	12.80	13.55	13.55	13.90	15.65	16.15	21.12	19.90	19.90
Iran	Light	34°	12.81	12.81	12.81	13.45	16.57	18.47	22.00	22.00	23.50
	Heavy	31°	12.49	12.49	12.49	13.06	16.04	17.74	19.90	19.90	19.90
Iraq	Basrah	34°	12.67	12.60	12.60	13.29	15.70	16.40	19.93	22.29	22.29
Iraq	Kirkuk (Gulf)	36°	12.89	12.85	12.85	13.52	15.94	16.65	21.25	21.25	23.50
Iraq	Kirkuk (Med)	36°	n/a	n/a	n/a	n/a	16.28	–	–	–	–
Kuwait	Burgan	31°	12.37	12.27	12.22	12.83	15.80	16.40	19.49	21.43	21.43
Libya	Brega	40°	13.92	14.00	13.85	14.69	18.25	21.26	23.45	23.45	26.27
Mexico	–	–	–	–	–	–	–	17.10	22.60	24.60	24.60
North Sea	Forties Type	36.5°	14.10	13.65	14.15	15.50	18.20	23.20	23.20	23.20	26.27*
Nigeria	Bonny	37°	14.22	14.33	14.12	14.80	18.52	20.96	23.49	23.49	23.49**
Oman	–	34°	–	–	–	13.94	17.50	–	–	–	24.20
Oatar	Dukhan	40°	13.19	13.19	13.19	14.04	17.04	17.04	21.42	21.42	21.42
Oatar	Marine	36°	13.00	13.00	13.00	13.78	16.85	16.85	21.23	21.23	21.23
Saudi Arabia	Berri Light	39°	–	–	13.22	14.01	16.47	17.87	21.32	21.32	21.32
Saudi Arabia	Light	34°	12.09	12.70	12.70	13.34	14.55	18.00	18.00	18.00	18.00
Saudi Arabia	Medium	31°	11.69	12.32	12.32	12.89	14.05	17.54	17.54	17.54	17.54
Saudi Arabia	Heavy	27°	11.37	12.02	12.02	12.51	13.64	13.64	17.17	17.17	17.17
Venezuela	Tia Juana Lt.	31°	13.54	13.54	13.54	14.22	16.70	17.30	20.90	Price of heavy crude raised by $0.50 $1.20/bbl from Oct 1	*Prices of North Sea crude **Nigerian prices increased. Details not published yet.
Venezuela	Tia Juana Hvy.	27°	12.39	12.49	12.39	13.01	15.38	15.98	18.68		
Venezuela	Oficiana	35°	13.99	13.99	13.99	14.69	17.21	17.81	22.45		

International Petroleum Times

Pipelines
The Best Way to Move Petroleum Products?

Bobby Ellis
Defense Fuel Region, West

West Coast pipelines, which include both government-owned systems and those belonging to private companies, play an important role in supplying some 19 military bases in several western states. More than 3,500 miles of pipeline, carrying 650,000 barrels of fuel per day, traverse the states of Arizona, Idaho, Nevada, Oregon, Washington, and Texas.

The Defense Logistics Agency owns upwards of 10 percent of the volume of fuel that is shipped through these systems. It is important to note that the government-owned pipelines do not compete with the privately-owned systems. The government systems simply augment the supply capabilities of the commercial lines delivering product to military installations.

It costs the government an average of $.187 per barrel to transport fuels by pipeline compared to barge rates of $.40, tanker rates of $.60, and tank trucks rates of $.468 per barrel. The use of pipelines saves the Defense Fuel Supply Center millions of dollars annually. Without a doubt, this is one of the most economical modes of shipping fuels.

Most of the pipeline systems are multi-product; that is, jet fuels, aviation fuels, motor gasoline, diesel fuel, and other petroleum products are shipped to customers thousands of miles from the fuel source. As a matter of fact, many military activities rely heavily upon pipelines and some are supplied solely in this manner.

Sophisticated pipeline systems are proving to be the most economical and efficient ones to operate. Computer simulation and control have been successfully integrated into these systems to assist in calculating flow rates, setting delivery times, doing stock accounting, and maintaining weekly and monthly pipeline schedules.

Defense Fuel Region West (DFR-W) was recently instrumental in the construction of a soon-to-be completed 55 mile, 6-inch commercial pipeline connection between Victorville, California, and Edwards Air Force Base. When it becomes operational in 1980, the new pipeline will meet the increasing fuel needs of that base and at the same time help reduce the daily flow of commercial trucks hauling volatile products over the heavily traveled Los Angeles freeway systems. Present truck tariff data indicates that annual transportation savings from this pipeline, after amortization of construction costs, will be in excess of $1,200,000.

A proposal now under consideration involves the construction of a 3.4 mile, 12-inch pipeline from Richmond, California, to the Defense Fuel Support Point, Point Molate. Such a pipeline would reduce the DFSP's dependence upon barges and tankers for resupply.

Experience indicates however, that DFSC and DLA must take the initiative in providing industry with the incentives to build the necessary pipelines. Analyses by DoD of supply and distribution

systems and the projected capability of industry, both truck and barge, to meet DoD bulk petroleum transportation requirements, would provide some of those incentives. We are experiencing increasing difficulty in obtaining trucks from industry, and barge availability in some locations is a matter of continuing concern.

A major factor is the matter of present and future compatibility of existing government-owned pipeline systems with commercial pipeline systems to which they connect. Commercial pipeline systems are continuously being upgraded to move larger volumes of products at much faster rates. In recent months, DFR-W has been denied the use of the San Diego pipeline for shipments of products from Defense Fuel Support Point (DFSP), Norwalk, to DFSP Point Loma because the DFSC facility was not able to receive products at the mainline rate.

To minimize both the short-term and long-term impact of incompatibility gaps like this, we would be well advised to begin now to identify known and projected deficiencies. Logic would also dictate that we follow this up by embarking upon a bold and imaginative program of pipeline systems rehabilitation. The consequences of not doing so, in terms of potential disruptions to product movement and essential military operations, should be obvious.

Because of its proven reliability in moving large volumes over great distances economically and with minimum risk of degradation of fuel integrity, the commercial pipeline system should be recognized as a key and indispensable factor in DoD petroleum logistics.

Whether or not the present systems are available for DoD use in the future or not depends, in large part, upon what we do today to ensure compatibility between government-owned systems as they connect or interface with commercial pipeline systems. ■

The use of pipelines is one of the most economical modes of shipping fuels.

DFSC's Emergency Supply Operations Center

Major Marion R. Harrington, USAF
Directorate of Supply Operations

The recent crisis in Iran has once again emphasized the importance of America's armed forces and the fact that they may be called into action with little, if any, notice. This means that those who support the military services must be responsive to their needs, even under the most trying circumstances.

In order to assist the services in emergencies, the Defense Fuel Supply Center (DFSC) maintains an Emergency Supply Operations Center (ESOC). The ESOC, under the Directorate of Supply Operations, Stock Control Division, is the focal point within DFSC for all information concerning emergency supply and distribution operations.

In order to carry out its mission, the ESOC has a number of responsibilities and functions. They are as follows:

- ESOC serves as a single point of contact within DFSC for matters pertaining to emergency supply actions. The ESOC can be reached by telephone (Autovon 284-8105/06/13/14), and by TWX, message, or mail (ATTN: ESOC or Code OCB).

- Receives and disseminates information relative to incidents which might affect DFSC mission performance; i.e., fires, line breaks, tanker problems, mishaps, bomb threats, and labor problems.

- Collects, evaluates and displays data related to normal and emergency or crisis situations.

- Reviews existing emergency plans and, in conjunction with staff elements, participates in the development of support plans and instructions.

- Recommends to DFSC staff elements any measures that might improve or alleviate an emergency condition.

- Maintains a state of readiness to provide immediate response to emergency supply situations and crisis conditions.

Under normal conditions, the ESOC involves only the Directorate of Supply Operations. However, in cases such as the Iranian crisis, the Command Control Center (CCC) replaces the ESOC.

The CCC becomes the command center for HQ DFSC and the focal point for emergency action during periods of natural disaster, certain domestic disturbances, military alerts, special military exercises, or when directed by the DFSC Commander. The CCC includes the ESOC, but adds representatives with various specialities (e.g., procurement, quality assurance, financial, etc.). The CCC is formed at Defense Readiness Condition (DEFCON) 4 or by direction of the DFSC Commander. By consolidating essential personnel in one place, the CCC is able to make necessary decisions in the limited time periods which are common in an emergency situation.

To summarize, under normal circumstances the ESOC serves as the focal point for any emergency supply and distribution actions which require DFSC assistance. Under emergency conditions, the ESOC becomes the Directorate of Supply Operations representative to the CCC and also facilitates the change between the two.

The Emergency Supply Operations Center is one important way in which the Defense Fuel Supply Center strives to provide the best possible service to its many customers. ■

Production - Consumption Imbalance

International Petroleum Times

The U.S. oil and energy dilemma is highlighted by its domestic production and consumption pattern for 1978 and the first quarter of 1979. Of the total 43.7 million b/d of oil equivalent used, oil itself accounted for an average of 18.7 million b/d. 42.7 percent of the total energy materials consumed. Of this huge total 8.1 million b/d were imported. Last year U.S. crude production ran at an average of 8.70 million b/d.

Domestic production of crude oil in the U.S. averaged 8.45 million b/d during the first quarter of 1979, a decline of 0.8 percent compared with the same period in 1978. Production in the lower 48 states declined from 7.6 million b/d in 1978 to 7.2 million b/d in 1979, while output from the Alaskan North Slope increased some 40 percent in the 1978-79 first quarter comparison, from 0.9 million b/d in 1978 to 1.2 million b/d in 1979. Production of natural gas liquids fell 1 percent to 1.55 million b/d in the first quarter 1979.

The contribution of Alaskan North Slope crude to total production grew from less than 11 percent in the first quarter of 1978 to 15 percent in 1979. Lower tier and upper tier production each comprised 35 percent of domestic production with stripper well output providing some 15 percent. Production from the U.S. continental shelf in the Gulf of Mexico accounted for 20 percent of U.S. total output.

U.S. proved reserves of oil declined 1.7 billion bbl in 1978 to 27.8 billion bbl. Increased oil production was responsible for this. Reserves added in 1978, 1.3 billion bbl, respectively.

1978 reserve additions reflected a total of 273 million bbl from exploration activities--new field discoveries and new reservoirs in existing fields; 336 million bbl from the extension of present fields, and about 700 million bbl from revisions of reserve estimates for existing fields.

The U.S. Department of Energy estimates an additional 70 million bbl of oil could be added to U.S. reserves from five projects requesting certification under the DOE tertiary enhanced recovery program.

Total U.S. demand for refined petroleum products averaged 19.89 million b/d in the first quarter of 1979, 0.7 percent lower than demand in the first quarter of 1978. Temperatures across the country were 4 percent warmer in the first three months of 1979 than in 1978, and contributed to the demand fall. A further factor must have been the general shortage of product because of the Iranian crude oil supply shut-off.

The decrease in total oil demand occurred despite the continued rapid growth of motor gasoline demand, which, despite the Iran crisis, in the first quarter of 1979 increased 3.4 percent over the same period of 1978. Jet fuel demand experienced remarkably high growth, increasing 7.1 percent in 1979 over first quarter 1978 consumption levels. Demand for both distillate and residual fuel oil in the first quarter of 1979, however, fell in response to warmer winter temperatures, declining 1.1 percent and 5.9 percent respectively, from first quarter 1978 rates.

The Independent Petroleum Association of America estimates that oil demand for 1979 will average 18.926 million b/d, less than a 1.2 percent increase over 1978. Less crude, slower economic growth, normal weather patterns, and possible mandated energy conservation plans are the chief forces slowing demand. Quarterly forecasts for the rest of the year are as follows:

2nd Quarter - 18.055

3rd Quarter - 18.116

4th Quarter - 19.119

Total 1979 - 18.926 ■

Defense Energy Information System
Inception, Present, Future

Samuel M. Bradshaw
Office of Comptroller

The Defense Energy Information System (DEIS) is a worldwide, automated, management information system. It provides data on petroleum products (DEIS-I) used as mobility fuels by the military departments as well as most energy sources used for utility services at DOD installations (DEIS-II).

In October 1973, the Stanford Research Institute (SRI) completed an in-depth study of energy data available within the Department of Defense and the results were presented to the Defense Energy Task Group in early November. Some of the more salient findings of this voluminous report were:

- Data on energy is available within the DOD components but no central repository exists for consolidation. Data is too fragmented to be immediately available for any type decision process.

- For some energy types partial information is available in several dispersed data bases within DOD; for other energy types, none is available, nor are mechanisms established to collect data. It is extremely difficult to rapidly assemble all data known to be available in the data bases pertaining to a given energy problem because of different recording, accessing, and processing procedures.

- The Defense Fuel Supply Center is the focal point for fuels within DOD and must be considered as a primary candidate to assume the development of a central DOD energy data repository. As a result of the study, SRI made several key recommendations to the Department of Defense including:

- The immediate development of a DEIS based upon the DFSC data bases and procedures.

- The augmentation of a DLA/DFSC computer system and personnel to support the DEIS development and operation.

- The establishment of a standardized reporting format for all the DOD components to provide a uniform data base on which DEIS can be built.

The Defense Energy Task Group recommended to the Department of Defense that DLA be immediately tasked to develop a DEIS.

The DFSC Comptroller's Office was tasked with the implementation and maintenance of the system and a reporting format was developed and distributed to the military services for their input. The data requested during the initial phase of DEIS consisted of inventory on hand, past 7 days issues, ensuring 7 day due-in, and anticipated issues for the next 7 days.

When the first message reports began to flow into DFSC mechanization was not available, and the first report and five subsequent reports had to be manually compiled. The initial report, 10 through 17 December 1973, provided petroleum data from approximately 1,300 activities.

In February 1974, DFSC began development of a DEIS-II to report all other energy consumption, i.e., electricity, natural gas, coal, propane, etc. This system was operational for the March 1974 report period and later replaced several other DOD utility reports. One of the primary uses of DEIS-II is to measure conversation programs within DOD. Currently,the DEIS-II data base has approximately 1,100 reporting activities.

In early FY 1975, DFSC requested approval from the Department of Defense to further expand DEIS-I in order to provide a balanced reporting system. In addition, DFSC requested a manual be written to provide continuity for reporting procedures. This was approved and in May 1978 the DEIS Manual, DOD 5126.46-M, was published and released to the military services. The new reporting format provides for a self-balancing report and specific usage and loss data not previously available.

Reporting in the current DEIS-I system is accomplished by means of three data cards designed for direct input into the computer system. One set of cards is reported for each grade of product stored and/or used by the reporting activity. These cards provide a three position system indentifier code of MEA, the DODAAC/ULC of the reporting activity, the Julian date of the asset cut-off (always the last Friday of month reported), and a three position product code.

The first card (MEA 2) deals specifically with product transactions which occurred during the month through the reporting activity's system. Specific data elements reported by grade of product are:

- Opening Inventory - Measured on-hand inventory at the beginning of the report period.

- Issues - Total quantity which has been issued through the reporting activity system including issues to consuming vehicles regardless of ownership, bulk transfer/sales, and decrease in inventory due to regrading and determinable losses.

- Receipts from Commercial Contracts - Quantity received during the report period from contract sources delivered into the reporting activity system.

- Receipts from DOD - Bulk receipts from intra and inter-service transfers; also includes gains to inventory caused by regrading of product.

- Closing Inventory - Measured inventory as of the asset cutoff time.

The second data card (MEA 3) is utilized primarily to report consumption by the reporting military service and the use to which the product is applied. Data on this card reflects those quantities of fuel issued into using entities of the reporting activity's own military service for immediate consumption. This card also provides two other data fields. Data reported on this card consists of:

- Primary Use - Quantity of product consumed utilizing the product in equipment for which it was procured. Example: JP-4,Jet aircraft propulsion.

- Secondary Use - Quantity of product consumed in equipment other than primary. Example: JP-4 - Electrical power generation.

● Tertiary Use - Quantity of product consumed in a third manner. Example: JP-4 - Heating plant.

● Quantity of product down-graded and quantity applicable to determinable loss (i.e.,pipeline rupture, etc.).

● Quantity obtained from into-plane contracts and forms 15/44 purchases for aviation fuels--oil company credit cards for ground products consumed.

The third data card (MEA 4) is designed to provide detailed issue data for all product issued to activities other than the reporting activity. Columnar data elements are different for each military service, therefore the example of data reported is provided below as an Army activity would report:

● Quantity of product issued into an Air Force vehicle or other end item for immediate consumption.

● Quantity of product issued into a Navy vehicle or other end item for immediate consumption.

● Quantity of product issued into a Marine vehicle or other end item for immediate consumption.

● Quantity of product issued to non-DOD activities. Includes all issues made to any agency outside DOD for both bulk and into-consuming entity.

● Quantity of bulk transfers to other Army activities. Example: Tank truck transfer from Fort Belvoir to Davidson Army Airfield.

● Quantity of bulk product issued to DOD activities other than U.S. Army.

From these three mechanized transactions the computer program can summarize consumption by military service, receipts from contract, receipts from DOD, losses credit card purchases, etc.

A complete description of all data elements, machine format and procedural requirements are outlined in DOD manual, DOD 5126.46-M. Compliance with all the procedures outlined in the manual allows direct machine processing thereby permitting the DEIS reports to be generated in a timely manner.

DEIS-I has approximately 1,192 reporting activities with an average of five products being reported at each location. The retail DEIS-I therefore has approximately 18,000 lines of data per month. DFSC inputs data from 125 wholesale locations with approximately 1,000 data lines. The accuracy and timeliness of activity submission in accordance with DOD instructions is of prime importance in the accuracy of the final report each month. Activities utilizing Autodin transmission instead of message transmission have much greater accuracy, therefore we encourage use of Autodin wherever capability exists.

With the rapid deterioration of energy supply, the change from a buyer's to a seller's market, and the need for new energy sources, there is a need for improved capability of quick reaction data. DFSC is currently planning improvements in the DEIS data bank that will allow sophistication in the following areas:

● On-line inquiry programs for user accessibility with the capability for graphics hardware, microfiche output, and generalized data analysis.

● Data for conservation analysis which will provide as a minimum: square footage of facilities, heating/cooling degree days, and energy costs by type of energy consumed.

● A generalized data base management system (DBMS) is under consideration with on-line input and correction capability.

● Data base for new energy types, i.e., solar, geothermal, wind, etc., is to be programmed.

● Input of WRM levels and total storage capability is being considered.

With these and other systems improvements, the DEIS will fulfill the original concept envisioned in 1973 and become a viable central information repository.

The Management Information and Analysis Division (DFSC-CB), Office of Comptroller, maintains operational control and is the point of contact for DEIS. All questions, suggestions, or general information regarding this energy management tool would be readily accepted by this office. Telephone (autovon) 284-7363/4 or 7334/5. In addition, personnel who are tasked with the submission of data are asked to contact DFSC-CB if they have any problems, suggestions, etc., so that we may work together to provide the best possible products to our many users. ■

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20 INDUSTRIAL NATIONS WORK TO SAVE ENERGY

Department of Energy

Tax credits, grants, appliance labeling, building standards, home weatherization, and national speed limits sound like a very mixed bag, but they all add up to an international energy conservation campaign.

Energy conservation policies in International Energy Agency (IEA) nations have many things in common; for instance, the taxing power is used to encourage energy thrift (credits for home insulation) or penalize energy waste (higher taxes on large and inefficient cars). Even so, each nation's approach to energy conservation has been shaped in large part by its climate, energy resources, and degree of dependence on imported energy.

For instance, Belgium imports a large majority of all the energy it consumes. Belgian law requires yearly cleaning of oil and coal burners and limits the temperatures of public building to 20 degrees Centigrade (68 degrees Fahrenheit) in offices and 18 degrees C (64 degrees F) in schools.

Although New Zealand has good energy resources, it also has mandatory building energy codes and offers

interest-free loans for insulating existing homes and for installing solar water heaters. The government has imposed a national speed limit of 80 kilometers per hour (about 50 mph).

Canada, which also has substantial energy resources, seeks energy self-reliance by the mid-1980s. Towards this, the Canadian government recently increased its excise tax on heavy passenger cars. The Canadians have also limited heating in federal buildings (and in conserving energy have also saved an estismated $30 million a year) and have removed federal sales taxes from insulating materials.

Italy must also import a very large part of its energy. Its laws include national maximums for space heating and hot water temperatures, and a heavy tax on heating oil encourages prudent consumption.

The Dutch motto is "Verstandig met Energie"--"Use Energy Wisely." The Netherlands is one of several European nations that are encouraging district heating, in which central urban plants supply hot water and steam heat to surrounding homes and businesses.

In Sweden, refuse has become a natural resource. Fourteen refuse incineration plants burn trash to recover its heat, which is used to generate electricity for residential and commercial use. One plant has produced the energy equivalent to that in 160,000 barrels of oil. Most of the plants are operating in the black, and more are being constructed.

Two-thirds of the energy used in Japan must be imported. The Japanese planted the seeds of energy conservation in 1951 with passage of a Heat Control Act for larger factories. Now, some 25,000 heat control officers monitor industrial energy consumption. Japan also imposes a progressive tax on cars by their size and weight, and the auto industry voluntarily labels new cars for fuel efficiency. Because of other legislation, hundreds of thousands of Japanese homes have solar water heaters.

Ireland's program includes grants to industry that partially cover the cost of hiring energy auditors. To keep the idea of conservation green, the Irish frank their mail with "Conserve Energy" for two months each year.

Like many nations, Spain has established compulsory insulation standards for new homes, but it also regulated display lighting in shop windows and on streets and highways, and urges its many tourists to save energy in hotels.

West Germany relies heavily on tax incentives to encourage the installation of energy-efficient equipment in homes and factories. Industry's contributions include producing washing machines with high-speed spin cycles so that laundry requires less drying time.

While Norway is a net oil exporter because of its rich oil fields in the North Sea, Norwegian policies include allowing industry to set aside tax-free funds if they invest in equipment to capture and use waste heat or if they use waste products as fuel.

Although IEA nations employ diverse methods and policies to save energy, the International Energy Agency estimates that together they will reduce total IEA energy consumption significantly by 1985. ■

Quality Assurance/Surveillance Conference

Colonel Robert R. White, USA
Commander, Defense Fuel Region
Europe

Captain Hamilton, Colonel White, and Dr. Krynitsky share their enthusiasm with participants at the 4th QAR Conference.

Colonel Robert R. White, the Commander of Defense Fuel Region, Europe (DFR-E), hosted the 4th Quality Assurance conference in Stuttgart, Germany, from September 25 to 27, 1979. The theme of the conference was "What Can the QAR Do For You?"

All of the Services (DFSC's customers) were well represented at the conference and representatives had an opportunity to express their thoughts on what DFR-E could do to be of more service to their customers. In addition, QAR's and customers exchanged ideas, evaluated current quality assurance/surveillance policies and procedures, and received an update on the latest programs of the military services and DOD.

Captain O.W. Hamilton, Jr., the Deputy Commander of DFSC, opened the conference by explaining what the QAR, as well as the customer, could expect in the future. He pointed out that the petroleum QAR is expected to play a bigger role in easing the strain of the energy crisis. Also, the QAR's job as the eyes and ears of the contracting officer must be utilized to the fullest if DFSC is to meet the needs of the Services.

Dr. John A. Krynitsky, the DFSC Director of Technical Operations, was on hand to outline DFSC's position and assure that consideration would be given to worldwide applications of some of the suggestions made at the conference. He also presented an overall view of DOD's involvement

in assisting in the development of synthetic fuels.

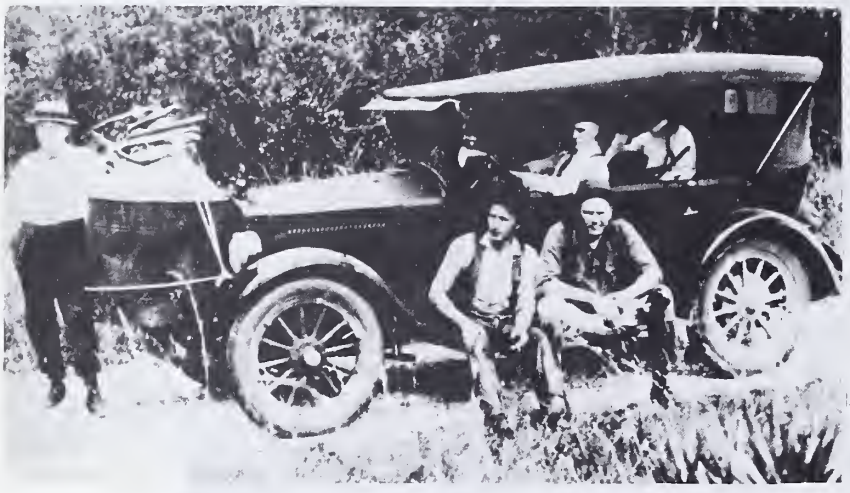
The conferees left with the consenus that the old ways are not necessarily the best ways, and many of the tried and proven ways have outlived their time. The requirement of getting the right product, in the right place, in the right quantity, and doing it all on time, is going to become harder in the future.

DOD is depending on petroleum professionals like those who attended this conference to come up with ideas that afford more for our petroleum dollar. ■

From l to r : First row - Jack Braun, Jim Skaggs, and Dr. Krynitsky. Second row - Bill Carley, Cliff Daniels, Fred Lastra, and Alex Bentley. Third row - Bob McDonald, Joe Long, Lt Robert Pierce, Jake Riley,and Sgt Kizer Paulk.

'Moonshiners' of Yesterday Could Be Gasohol Entrepreneurs Today

Energy Insider



Today, these glum prohibition era gentlemen sitting on the running board of the Treasury agents' car might be using their skills to produce alcohol fuels instead of corn whiskey.

In prohibition days, government agents swept through the back country of America smashing thousands of copper contraptions distilling whiskey from corn and other grain.

Today, the government is encouraging the production of alcohol as a means of stretching the U.S. fuel supply and decreasing the nation's 50 percent dependence on foreign oil.

In some cases, businessmen,farmers, and federal officials are actually seeking out practitioners of the distiller's art to learn how to produce alcohol to make gasohol. Most of these efforts are aimed at making the alcohol from corn waste, cheese whey, and numerous other products left over from the food and fiber manufacturing process.

"Gasohol" is rapidly becoming the universal or generic term for a blend of 90 percent gasoline and 10 percent ethyl alcohol or ethanol. It's currently being sold in more than 800 retail outlets in 28 states.

Three factors contributing to the increasing popularity of gasohol are higher octane ratings than those for unleaded gasoline; consumer preference for alcohol fuel, particularly in the farm states; and lower pump prices for gasohol than for lead-free premium gasoline.

The use of alcohol in motor vehicles, of course, is not new. Henry Ford designed the Model T to run on gasoline, alcohol or any mixture in between. During World War II, the United States operated an ethanol plant in Omaha to produce fuel for the Army.

The Department of Energy has received the results of four extensive tests conducted by state governments of Illinois, Nebraska, and Iowa and the American Automobile Association which indicate that the

great majority of vehicles that were tested ran as well or better on gasohol than on the conventional fuels.

Through 1985, the contribution of alcohol fuels is expected to be modest nationally--perhaps displacing about 40,000 barrels of oil per day and reducing imports by about four-tenths of one percent. Production will be limited by the capacity to convert agricultural and waste materials into alcohol. This figure could be increased dramatically if Congress enacts the President's proposed synthetic fuels program, of which alcohol fuels would be a major part.

Ethanol--made from fiber wastes--is the only alternative fuel commercially available now, and the one likely to be available in quantity before 1985. Methanol--which can be made from coal using commercially available technology--could be used in large quantities in the mid-to-late 1980's if construction of plants is begun soon.

Research is now underway aimed at reducing the cost of alcohol to less than a dollar a gallon from its present level of $1.20 to $1.50. A federal tax exemption already has lowered the pump price of gasohol by four cents a gallon, and some states have added another four to seven cents exemption.

To increase production capacity, the government is providing loans and grants for construction of 100 small distilleries for the production of alcohol fuels and enhanced investment tax credits are being offered.

Critics of gasohol contend that distilling alcohol may use more energy than it produces, resulting in a net energy loss. To this the Department of Energy responds: "The key issue is not whether alcohol can produce a net energy gain, but whether it produces a net gain in high-grade fuels."

Production units can be designed to run on fuels other than oil and gas, and agricultural wastes can be used as the primary feedstock. Under these conditions, the Department of Energy concludes, there is no doubt about the net benefit to the nation from alcohol fuels. ■

A Word From Roosy

Captain Robert L. Jarvis, USA
Defense Fuel Quality Assurance Office
Caribbean

On June 13, 1977, the Times insert magazine cover story read, "It's Not Heaven, It's Just Puerto Rico--Naval Station Roosevelt Roads."

Roosy is the acronym for NAVSTA Roosevelt Roads, Puerto Rico, and it's home away from home for DFSC's Defense Fuel Quality Assurance Office, Caribbean (DFQAO CARIB).

Like the tip of an iceberg, the office at Roosy represents the focal point of a very large operation for DOD bulk petroleum quality assurance for the entire Caribbean, Central America, South America, and Mexico.

Eleven personnel are currently assigned to this parcel of the world to cover four staffed residencies and four unstaffed locations. Much time is spent on the road in support of the unstaffed sites.

The main office is a true joint-service organization. The office chief is Navy LCDR Denny W. Ireland; Bill Biggs, a civilian, is the technical advisor; and the Army and Air Force are represented respectively by itinerant QAR's CPT Bob Javis and MSGT Bill Murchison. Completing the team is the secretary, Phyllis Aubin.

There are four personnel assigned to St. Croix, USVI, at the Hess Oil Refinery, one of the largest in the world. USAF Captains Alex Erhard and Tom Ellison work with Orlando Garcia and Felix Garcia. Although they have a full-time job at St. Croix, they have individually spent much TDY effort in supporting the SPR program in Mexico and at other residencies.

While Capt Erhard sighs "Another Day in Paradise," looking from his exclusive condominium balcony across the low range of rolling hills into the still, blue Christianstead Harbor and beyond to the yachts of the traveling rich, it is sometimes too easy to forget the frequent separation from family on TDY trips and the long and demanding physical and mental efforts of loading dangerous petroleum products aboard back-to-back tankers with temperatures approaching 100° outside and well over 110° in the 50-foot deep ship's tanks that have to be inspected.

Everyday living expenses like utilities and food would even make an inflation conscious big city dweller flinch as the QARs and their families mingle with the vacationers who are prepared to spend "mad" money for their holidays. For our Caribbean QARs, there is no holiday from these inflated costs, although the beautiful scenery can often lull the inflation "blues."

Four hundred and fifty miles south, through the hurricane belt, lie three small Dutch protectorate islands off the coast of Venezuela, called the Netherlands Antilles. They are Aruba, Bonaire, and Curacao, also known as the ABC Islands. DFQAO Carib has two resident QARs there.

The Hess oil docks at Lime Tree Bay, St. Croix, U.S. Virgin Islands.

Beautiful resort areas are some of the minor compensations in Caribbean assignments.

On a lucky day the QAR might not have to climb to the bottom of all 30 of the 50-feet-deep ship's tanks.

The laboratory at Lago Aruba.

This beautiful bridge spans the entrance for tankers into the Curacao Harbor. Cruise ships and tankers pass through the downtown area of Curacao.

LT Mike Josef, SC, USN, is QAR at the Shell Refinery on Curacao and has also been tasked to work at the Curacao Crude Oil Terminal handling SPR crude transshipments. Mike, a bachelor, has gotten to see a little bit of Europe in the Caribbean, as Curacao is billed, but he has also experienced all of the frustration and fatigue of running a busy, one-man operation. His main regret has been having to put his Harley Davison in. CONUS storage while overseas.

On the island of Aruba,Bill Rankin is the DFQAO Carib QAR at the Lago Refinery and the only official U.S. Government representative on the island. He has settled into the difficult routine of working on a resort island with his lovely wife "Sammy", son Bill, and daughter, Kimberly. Word is out that he has also been seen on the soccer field with the local Dutch Marine detachment.

That about covers the staffed residencies in the area, but certainly not all of the work sites.

Buildings at the Texaco Refinery in Trinidad closely resemble those of WWII vintage.

Venezuela's northern peninsula has an abundance of some natural resources such as oil, but the lack of fresh water prevents it from becoming as popular a tourist resort as other Caribbean areas.

In rural Mexico, at Coatzacoalos, DFQAO Carib provided extensive support to the lifting of crude oil for the SPR program.

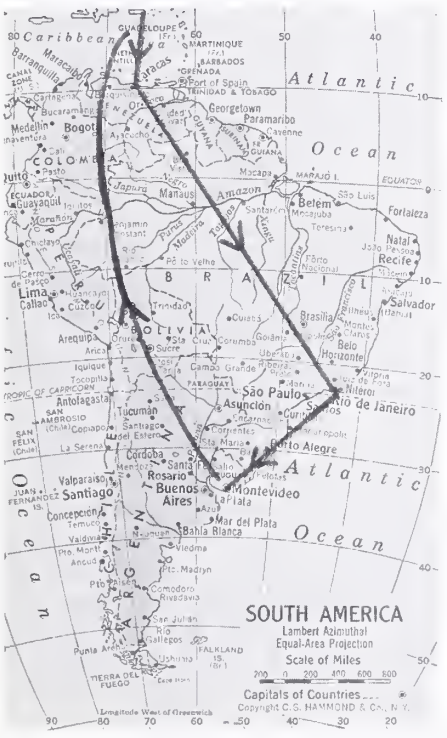
The idyllic island of Bonaire saw much QAR coming and going in the recent past as QARs scrambled to meet giant tankers (VLCCs) bringing crude oil to BOPEC (Bonaire Petroleum Corporation) for transshipment to the U.S. SPR program in shuttle tankers.

The island of Trinidad, and the Texaco Refinery there, is also a TDY destination approximately once a month. To the beat of steel drums and the sound of calypso music, the QARs dodge traffic which moves under the British system of driving on the left.

Since the spring of 1979, bulk petroleum products for DoD have once again been coming out of Venezuela from the Lagoven Refinery in Amuay Bay. Going into this Spanish-speaking environment for monthly tanker loadings has proven a formidable task since phone and message communications are not quite equal to the instant connections taken for granted back home.

Each year a DFQAO representative makes an into-plane inspection of civil airports having contracts with DFSC in South America. These inspections take the QAR far south of the Equator to Montivideo, Uruguay, and Rio de Janeiro, Brazil. Although it sounds like the perfect business trip, there isn't much time for sightseeing and the majority of the time is spent flying, inspecting, and sleeping, usually in that order.

So if you want to get out of the office, see the greater Caribbean, and meet the professional and personal challenges of working as a QAR, then watch for the next job opening at DFQAO Carib. You could find yourself waking up some morning to "Another Day in Paradise." ■



The route of the annual "see South America's major airport in less than six days" into-plane inspection.

Some travelers spend thousands of vacation dollars for a Caribbean vacation, while others can get a 3 to 5 year, all expense paid, vacation there.

U.S. Struggles Against Imported Oil

International Petroleum Times

Even before the Iran shut-off of 10 percent of the world's oil output in the first three months of last year, powerful voices on the international oil scene were castigating the United States as being the epicentre of a looming world oil crisis. Several important forecasts over the previous five years had predicted that world oil consumption would be running at record high levels by the end of 1978--more than 60 million b/d. With this rate of consumption expected to increase up to the end of the century by at least 2 percent per year, world oil reserves, standing at the end of 1978 at 650 billion bbl, would be unable to meet world demand by the mid-1980's. With the largest consumption of petroleum of any country in the world, 0.087 b/d per head, the United States was seen as the most profligate of the three regions of the industrial non-communist world.

The forecasters did not make any play of the fact that although the U.S. is the largest consuming country in the industrial world, it is also the world's second largest oil producer, after the Soviet Union. It continues to produce around half its petroleum product from indigenous supplies. Western Europe, the second largest region of the industrial world produces, thanks only to the North Sea, just a seventh of its petroleum product demand. Japan with a daily consumption rate of well over 5 million b/d produces none at all.

The U.S. is about 43 percent dependent on imported oil in its current energy economy. Western Europe is about 85 percent dependent, while Japan is 100 percent dependent.

An analysis of per capita dependence on imported oil in major industrial countries reveals that consumption of imported oil is 0.033 b/d by an individual in the U.S., in Japan it is 0.044 b/d, in Western Germany it is 0.048 b/d, and in France it is 0.045 b/d. From an international standpoint,the American individual as of now is the least dependent on foreign oil sources for its oil supplies of all consumers in the Western industrialized world. Japan is obviously the most dependent while Western Europe is becoming less concerned.

Economic comparison between the United States and Western Europe, other than statistically, is difficult. It is comparison between a single huge industrial economy and a number of smaller but powerful nation states. Europe is not yet integrated. For instance, the United Kingdom is about to become the fourth nation in the industrial world to be self-sufficient in oil, joining Canada, the Soviet Union, and Norway. Other West European countries are in the same plight as Japan. West Germany produced a mere 100,000 b/d of a 1978 annual consumption of 2.955 million b/d, France produced an even smaller fraction of its consumption last year of 2.445 million b/d. Thus the U.S.

oil supply situation matched against world standards of importation, could be adjudged comfortable. Such a conclusion would be misleading.

Indigenous production of crude oil and condensates in the United States is just over 10 million b/d. Proven reserves are estimated at some 27.8 billion barrels. There is thus enough oil left at the current rates of production for the United States, currently the world's second largest in the world, for less than nine years. Some 6 percent of the world's population is consuming about a third of the world's energy in all forms and, about a third of the world's oil production. The energy situation in the United States, heavily based as it is on petroleum and petroleum products, is grave to the point of catastrophe.

If the United States continues to make increasingly heavy demand on the world's available oil resources, two-thirds of which are located in OPEC countries, there would arise among the countries of the industrial world a competition for the oil that is available. This happened at the beginning of last year during the time of the Iranian shut-off. World supplies would again become permanently tight and prices would rocket.

This was forecast by leading OPEC spokesmen such as Yamani and Amouzegar when they attented the OPEC Ministerial meeting at Stockholm in June 1977. The market in fact would--and has--taken over oil pricing.

The United States economy cannot for ever tolerate huge oil bills. There have been forecasts, even from the U.S. Department of Energy, that the American oil import rate could increase to 10.5 million b/d by 1985 unless some constraint is forced on U.S. energy usage or energy sources other than oil are developed and made available to the U.S. public.

Identical, and sometimes even more serious, oil supply and oil payment problems exist in other industrial countries of the world where they are being tackled less dramatically and less publicly than in the United States. It is the massive scale of the U.S. problem--because of its huge size--which attracts the publicity.

But if America goes bust, so does the rest of the developed world. ■

PACOM Petroleum Logistics Conference

The 1979 Pacific Command Petroleum Logistics Conference was held at Camp Smith, Hawaii, from 31 October through 2 November 1979. The conference brought together approximately seventy-five representatives from CINCPAC, CINCPACFLT, Sub Area Petroleum Offices, CINCPACAF, OJCS, COMSERVPAC, Navy Petroleum Office, Military Sealift Command, Defense Fuel Region-Pacific, Defense Fuel Region-West, Department of the Army, Headquarters USAF, USA Petroleum Training Center at Ft. Lee, Virginia, DFSC, and numerous other organizations. The emphasis of the conference was on today's energy situation, DOD support capabilities and plans for the future. ■

Special Extraction Technique for Known Oil Reserves

Department of Energy

For every barrel of petroleum produced by most conventional current methods, at least two barrels remain in the ground.

Many old reservoirs hold billions of barrels of oil that could be recovered by advanced recovery concepts now under development by the Department of Energy and by industry.

Called Enhanced Oil Recovery (EOR), the program is designed to encourage and support industry participation in field demonstrations concurrently with in-house and contractor research. EOR processes being developed include micellar-polymer flooding, carbon dioxide, and thermal--all requiring fluid or heat injection through porous strata to release oil and/or move it to production projects.

DOE's Economic Regulatory Administration (ERA) has proposed an incentive program to encourage oil producers to initiate or expand certain types of EOR projects.

The proposal would lift crude oil ceiling prices for some current production enough to reimburse part of the producer's expenditures for more tertiary production. Pricing regulations under the proposed program would allow higher prices to cover 75 percent of certain specified expenditures actually incurred, up to $20 million per project.

The Division of Fossil Fuel Extraction in DOE has entered into 22 projects in 10 states. The Department's industrial partners are sharing up to 65 percent of the cost for field demonstration tests.

Several projects have been showing favorable results. For example: cumulative production of tertiary oil has totaled as much as 72,000 barrels at one site. Tertiary oil, the main target of EOR, is the oil remaining in a reservoir and unrecoverable by primary and secondary drilling procedures.

DOE estimates that two-thirds of the oil discovered to date remains in reservoirs (about 300 billion barrels), and is not producible with present-day techniques. The EOR potential is placed at 60 barrels of normal gravity oils and 28 billion barrels of heavy oils and bitumen.

Industry production with advanced processes now totals about 373,000 barrels of oil per day. That figure could rise to 600,000 barrels per day by 1985. Under the DOE-industry test program, the total production could be boosted by another 960,000 barrels per day by 1990.

The potential payoff from EOR could extend the supply of domestic oil resources by at least 10 critical years, according to DOE analysis. ■

First DFR Supply Managers Conference at DFSC

Seated from l to r : Ron Gerbig, Fred Watters, Bob Short, Amy Gillespie, Gladys Torporcer, Bill Moon, Tony Cooper, Russ Haberlah, Johnnie Reneau, and Betty Triplett. Standing: Stan Love and Fred Jennings.

The first Defense Fuel Region (DFR) Supply Managers Conference was held at Cameron Station from 16 through 18 October 1979. The conference, which was coordinated by the Inventory Management Division of the Directorate of Supply Operations, was designed to update DFR supply managers on policy and procedural changes and discuss problems related to petroleum availability. BGen L.R. Seamon, Commander of DFSC, welcomed the group and related what he is personally doing to obtain increased offers of products from industry.

The Defense Fuel Region representatives who attended the conference were: Fred Watters and Betty Triplett, DFR Northeast; Johnnie Reneau, DFR Southeast; Russ Haberlah, DFR Central; Bill Moon, DFR Southwest; and Tony Cooper, DFR, West. ■

Sulfur Dioxide - One of the Villians of Air Pollution

Treva C. Alston
Environmental Control Office

Sulfur dioxide is a major air pollutant that is created chiefly by the combustion of coal or oil that contains sulfur. Sulfur dioxide has a pungent, irritating odor and is more soluble in water than most other pollutant gases. It also reacts with water droplets in the atmosphere to form a secondary pollutant called sulfuric acid. This article discusses some of the health hazards and economic impacts of these pollutant substances, and also outlines the legislative and regulatory actions that have been taken to control them.

For years, asthma, chronic bronchitis, eye and nasal irritations, and even cardiac ailments have been identified as resulting from sulfur oxides.

In vegetation, sulfur dioxide causes both acute injury, characterized by clearly marked dead tissue between the veins or on the margins of leaves, and chronic injury, marked by brownish-red, turgid or bleached white areas on the blades of leaves. This usually happens to vegetation close to the source of sulfur oxide emissions.

Plants are particularly sensitive to sulfur dioxide during periods of intense light, high relative humidity, adequate plant moisture, and moderate temperature. Younger, fuller expanded leaves are usually most sentitive, but plants such as pumpkins, squash, apples, tomatoes, and greens are also affected.

The economic impact of sulfur dioxide effects on vegetation is twofold. First, the quality of the vegetation is impaired. Second, there is a question of how livestock are affected by eating vegetation that has been contaminated. In the United States, agricultural losses from air pollution are estimated at $500 million annually. From an aesthetic viewpoint, air pollution reduces recreational value for those who enjoy seeing healthy forests and other vegetation.

Sulfur dioxide has numerous effects on nonliving things in the environment. For instance, when sulfur dioxide reacts with moisture in the air it forms sulfuric acid and various other sulfates that settle on buildings creating a loose surface that flakes off.

Sulfur dioxide is a major corrosive gaseous pollutant because it is more prevalent than the others. In addition, sulfur which is highly reactive, tarnishes electric contacts which are usually made of copper or silver, and the resulting corrosion film acts as an insulation. This insulation reduces the free flow of electricity across the contacts and may lead to a short circuit and power failure. Gold is less susceptible to corrosion than

silver and copper, but at today's prices it is far too expensive to use for electrical contacts.

Solid-state devices and miniaturized circuitry add new problems, since even minute amounts of corrosion may impede the free flow of electricity more readily than with larger electric contacts. Computers, which use solid-state components and miniaturized circuitry, must be installed in rooms protected from air pollutants to escape corrosion.

Paper exposed to sulfur dioxide in the atmosphere turns yellow and brittle because paper tends to absorb water somewhat like a sponge, and the water combines with sulfur oxides to form sulfuric acid. Leather upholstery and bookbindings become brittle from absorption of sulfur dioxide.

With textiles, oxides of sulfur and other acid aerosols in the atmosphere cause increased runs in nylon stockings and loss of strength in cotton curtains and drapes. Oxides of nitrogen sulfur dioxide and ozone cause dyes to fade and white fabrics to turn yellow.

Most of the deterioration of materials by air pollution goes unnoticed because it cannot be distinguished from what might be called normal or natural deterioration. However, the cost of the material damage caused by air pollution has been estimated at $65 per person, per year. This includes cleaning costs, repair and replacement costs, overdeisgn, and reduced property values.

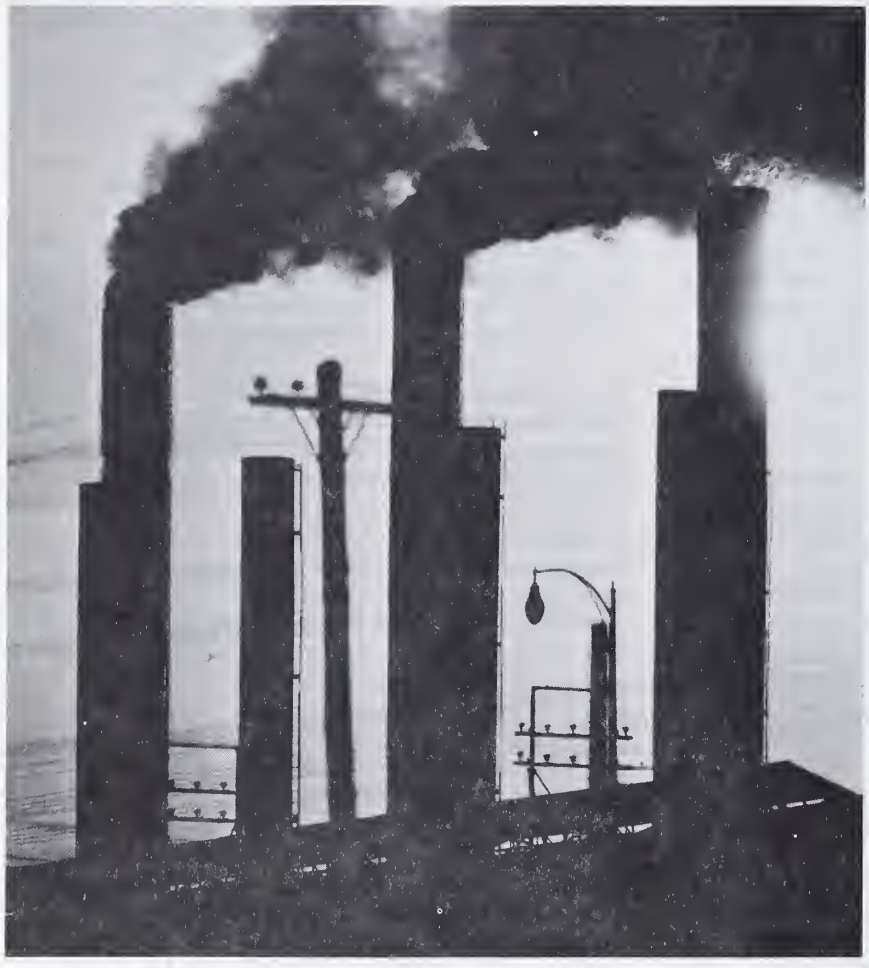
Because sulfur dioxide does so much damage to human and animal health, vegetation, buildings and other artifacts, federal, state, and and local governments have passed laws and taken other regulatory actions to control it.

The federal government first became involved with air pollution problems in 1955 when Congress passed Public Law 84-159, which allocated $5 million a year for fiscal years 1956-1960 to the Public Health Service to conduct air pollution research.

The Clean Air Act of 1963 (Public Law 88-206) increased the authorization for air pollution research to $95 million for fiscal years 1964-1967 and provided for a series of steps--culminating in legal action--that states, municipalities, and the federal government could take to end interstate and intrastate air pollution. However, in the case of intrastate pollution, the federal government could only act at the request of the state's governor.

It was not until the Clean Air Act Amendment was passed in 1970 that the Environmental Protection Agency (EPA) was given the responsibility and authority to control air pollution in the United States and its territories.

The Clean Air Act Amendments also required the administrator of EPA to promulgate National Ambient Air Quality Standards (NAAQS) for pollutants which he determined adversely affected public health and welfare. These standards specified the maximum permissible level of pollution in the ambient air. In 1970, the EPA promulgated national ambient air quality standards for six pollutants: particulates, sulfur oxides, hydrocarbons, carbon monoxide, oxides of nitrogen, and photo-chemical oxidants.



Two standards were issued for each pollutant. Primary standards were set at levels necessary to protect the publics' health and were to be met no later than three years from the date of promulgation (subject to limited extensions of up to three years). Secondary standards were designed to protect the public from adverse effects to their welfare, such as crop damage, reduction in atmospheric visibility, and corrosion of materials, and were to be met in a time frame considered reasonable by the administrator.

To implement these standards, the act required each state to adopt and submit to EPA a plan for attaining, maintaining, and enforcing the NAAQ's in all regions of the state. These plans are called State Implementation Plan (SIP's). Each state, therefore, decided (for each pollutant) the total emission reduction needed to maintain local ambient-air levels within the limits set by the standards, which emission sources needed to be controlled and to what extent.

SIP's prescribed emmision-limiting regulations, timetables for compliance with the limitations, and other measures, such as land

use and transportation controls necessary to ensure attainment and maintenance of standards. These SIP's are the state regulations. EPA is required either to approve the state implementation plans, thus, making them part of federal laws, or amend them to conform to EPA criteria for ambient air quality standards nationwide.

While the primary responsibility for enforcing SIP regulations rests with the individual states, the federal EPA is responsible for assuring that all implementation plan requirements are fulfilled. As a result, EPA provides technical and legal assistance to the states enforcing SIP regulations. If any state fails to enforce its implementation plan regulations, the federal government may take a number of administrative or legal actions against noncomplying agencies.

Environmental laws promulgated by state and local governments regarding sulfur in fuel may either limit the sulfur content of fuel purchased and stored, or the emission of sulfur or sulfur compounds. Often regulations are made applicable to each specific combustion unit for regulated air emission source. Some regulations limit the allowable sulfur dioxide concentration in effluent gas (parts per million SO_2 by volume) and the rate of emmissions (lbs sulfur dioxide per MM BTU/hr input). Other regulations allow fuel combustion sources to burn higher sulfur fuel oil provided the best available control technology such as air pollution control equipment, i.e., scrubbers, is used.

These regulations also vary as to units of measure in which the sulfur-limiting provision is expressed and the equipment (broiler size, stack height, or entire plant) to which regulations apply. In addition, some states control all emission sources equally, while other states prescribe different emission limits for each source according to the fuel used, the geographic location, source monitoring, or the type of source, (i.e., power plant, heating plant, or other combustion units).

Having provided an overview of the effects of sulfur dioxide on the health, vegetation, and nonliving materials along with the legislative and regulatory action to control this pollutant, I hope that you have a better understanding of the harmful effects associated with this air pollutant and the need for regulating its emission into the atmosphere. ■

Old Motor Oil Never Dies, It Just Suffers From Public Apathy . . . . . .

Energy Insider

A product that helps ease energy and environmental problems, saves money and works at least as well as a similar product used by nearly everyone should be a big success. Not so in the case of re-refined used lubircating oil. Few people use it. But Dennis W. Brinkman, a supervisory research chemist at DOE's Bartlesville (Oklahoma) Energy Technology Center (BETC), believes the time is coming when re-refined oil can supply a substantial percentage of U.S. lubricating oil needs.

Brinkman points out that several new processes--including one at BETC--have been developed to produce re-refined motor oils that perform as well or better than "virgin" motor oils, cost less and meet the highest grade standards after reformulation with additives. And, he adds, modern re-refining processes produce little or no pollution.

About 150 re-refiners were in business in the United States in 1960 with an annual combined production capacity of approximately 300 million gallons. Today there are only about 20 re-refiners, with an estimated production capacity of 50 million gallons.

Brinkman attributes the decline to several factors: the poor quality of some re-refined oils, lack of public trust in the product, lack of a workable used oil collection system, pollution problems resulting from sludge produced in some re-refining plants, unfavorable tax laws and the requirement that re-refined oil must be labeled "Made from previously used oil."

In virgin oils, Brinkman explains, the unstable materials react with engine parts and become contaminants in the used oil. These contaminants are removed as sludge during the re-refining process and are absent from the reformulated oil.

In the BETC re-refining process, neither acid nor caustic is used. Acid and caustic sludges create disposal problems because they are environmentally detrimental. The solvents used at Bartlesville to precipitate a neutral sludge are recycled. Brinkman notes that the new process also helps reduce pollution by diverting used oil to a re-refinery instead of it being dumped.

The Environmental Protection Agency recently declared used oil to be a hazardous waste, a move that will prohibit its being dumped or used for such purposes as road oiling. These new regulations were scheduled to go into effect at the end of 1979.

A major problem, says Brinkman, is that "there are very few crude oils which efficiently produce good lubricating oils, and they are diminishing quite rapidly, which is a primary reason for pushing for the recycling of lubricating oils."

Despite the apparent advantages, Brinkman believes it is unlikely that the general public will begin soon to use large amounts of

re-refined oil. "The public still does not trust re-refined oil," he says. "Major oil companies don't sell it, so the brand names are not recognizable to most people. Also, the consumer does not know whether the product is a good one."

He sees bulk users such as government and industry, who can specify and verify quality, as potential consumers of re-refined oil. Illinois is already buying re-refined oil for use in state vehicles and several other states are considering a similar move. Also, the Resource Conservation Recovery Act of 1976 requires that federal agencies buy re-refined motor oil when it is available and of a similar quality to virgin oil.

The Bartlesville Center recently awarded a contract to Market Facts, Incorporated of Chicago to study the problem of availability and to recommend the best approaches for increasing the percentage of used oil that is recycled. Scheduled for completion by January 31, 1980, the study is keyed to individuals who purchase oil "off the shelf" and who change the oil in their own vehicles. Along with other facts, the study will attempt to find out how much oil the "do-it-yourselfers" buy, how they dispose of it and their attitudes toward recycling.

Interest in the new process among potential re-refiners is high, Brinkman believes. He receives several phone calls and at least one set of visitors each week from persons interested in setting up a new re-refinery or retrofitting an old re-refinery to use the process. ■

Alcohol Fuels: Modest Impact Until Conversion Facilities Expand

Energy Insider

During the past year grass roots support for alcohol fuels has grown in general, and in particular for gasohol, a mixture of 10 percent alcohol and 90 percent gasoline. As a result of this enthusiasm, there are now over 800 retail outlets for gasohol in at least 28 states.

Stimulated by local and state actions, and by significant federal and state subsidies and other support, an alcohol fuels industry has been launched and is growing rapidly.

Ethanol, the form of alcohol now commercially available, is being produced at a rate of about 60 million gallons a year (4,000 barrels a day). Incentives are expected to push production to 300 million gallons a year (200,000 barrels a day) by 1982. In a 9-to-1 mixture with gasoline to make gasohol, that means 3 billion gallons of gasohol a year, which is 3 percent of current gasoline consumption.

With permanent extension of the federal excise tax exemption for fuels containing alcohol, as the President recently proposed to Congress, more investors would be encouraged to build new conversion facilities. By 1985, alcohol fuel production is expected to reach 500-to-600 million gallons per year, producing gasohol equivalent to 5 percent of gasoline demand, and substituting for 40,000 barrels of imported oil per day.

Alcohol fuels now receive a range of government incentives, including:

- The National Energy Act excise tax exemption, through September 1984, on gasoline/alcohol blends. This exemption is worth $.04 per gallon of blend and $.40 per gallon ($16.80 per barrel) of alcohol in 10 percent blends. Some states have also exempted these blends from state excise taxes.

- Eligibility for DOE entitlements, worth about $1.00 per barrel.

- USDA loan guarantees for alcohol pilot plants.

Over the past few months, the administration has taken these steps to further stimulate production and use of alcohol fuels:

- Presidential recommendation to extend permanently the excise tax emption. This will encourage investment in large alcohol conversion facilities amortized over many years.

- An additional 10 percent investment tax credit (for a total of 20 percent) for facilities that will convert alternative substances or feedstocks into synthetic liquid fuels.

- Assistance up to $11 million, in the form of loans, loan guarantees, and grants, to help build 100 small-scale alcohol conversion plants.

● Federal fleet use of alcohol fuels where available.

● Simplified federal reporting requirements for alcohol fuel producers.

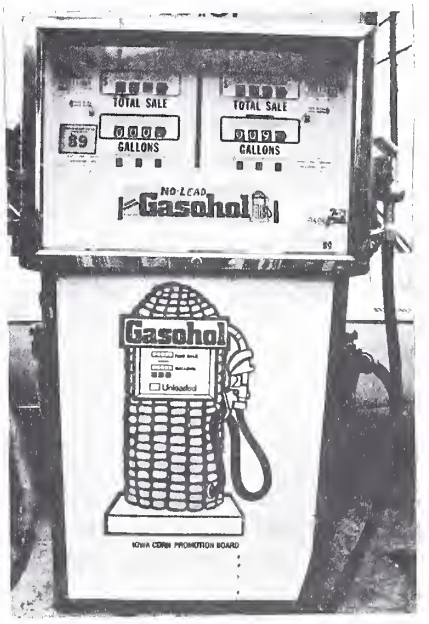
● Increased research and development for feedstock production and conversion processes. Funds have been increased from $2.9 million in FY 1977 to $24 million in FY 1980.

The Department of Energy believes it has put into place the kinds of incentives that will bring about the maximum contribution of alcohol fuels to the national energy program. More important than the predicted amount of alcohol fuel production is the combination of private and public initiatives which created the alcohol fuels industry and established it in the economy.

Gasohol is a fuel attractive to motorists for several reasons. Some feel they need the higher octane unleaded fuel for performance. Others want this performance at cheaper prices than high octane unleaded gasolines. Gasohol from the beginning has been competitive with these blends and is expected soon to be competitive with unleaded regular gasoline. Still others simply wish to use fuel derived from renewable resources.

The alcohol used in gasohol and other fuels can be either ethanol or methanol. Ethanol, which has roughly two-thirds the energy of gasoline, is made from cheese whey, citrus waste and other food wastes, corn and grain sorghum. It can also be made from sugar cane, wheat and sweet sorghum, as well as from municipal solid waste (MSW). Some of these feedstocks are free (e.g. cheese whey, which is discarded) or even have negative costs (e.g. MSW, which cities pay to dispose of). For the alcohol to contribute to the national welfare, the feedstock must not be competitive with other, more valuable uses, such as food, animal feed or export.

Methanol, with about one-half the Btu content of gasoline, can be made from coal, wood, corn, and wheat residue (stalks or "stover") and also from MSW. The economics of methanol production especially favors large conversion facilities. Coal exists in enormous quantities, while wood comprises 61 percent of the nation's biomass resources available for alcohol production. Consequently, intense research is being done with federal support to improve the conversion processes for turning lignocellulosics (wood fibers) into alcohol. If current efforts to achieve 25 percent conversion succeed, methanol production would dwarf all previous alcohol fuel output.



Large-scale production of methanol, however, is still in the future, whereas ethanol is here and now. Ethanol production is a natural step in the evolution of alcohol fuel production, which will be a significant part of the answer to the energy problem. In general, ethanol has little environmental impact compared to the pollutant problems of gasoline. The risk of added carbon dioxide (CO_2) in the atmosphere is the risk run in burning any fossil fuel, a risk that has not yet been fully determined. Even a million barrels of synthetic fuels a day, however, would only add one percent to the CO_2 being added to the atmosphere.

Ethanol production lends itself both to large-scale production with its economies of scale, and to small-scale, decentralized facilities with their savings in storage, transportation, and distribution. This will produce a lively mix of facilities in the alcohol fuel industry, with healthy competition and experimentation in feedstocks and conversion processes, as well as in coproduction of other useful products.

Gasohol represents the first step, the "here and now" phase of alcohol fuel production and use. Spontaneous product demand has created a new energy industry. This public participation in energy production, stimulating private investment and construction, is of value beyond the barrels of oil gasohol will displace. ■

Joe Muse Retires

Joe P. Muse, Laboratory Chief in the Petroleum and Field Services at Fort Lee, Virginia, recently retired from the government after 38 years of federal service. More than 100 co-workers and friends attended the retirement ceremony at Fort Lee and helped make Joe's last duty day a most memorable occasion.

Joe will be fondly remembered for his dedicated service in the petroleum communities of Alaska, Thailand, Vietnam, Europe, and several CONUS Army Depots. He spent the last seven years at Fort Lee.

Retirement plans for Joe include lots of golf and travel. We wish him the best of everything in the golden years that lie ahead. ■

Joe Muse, left, received a "Dry Tank License" from Robert Vibbert, DFSC Directorate of Technical Operations, at retirement ceremony.

Dead Wood Eases Pain

AFPS Clipsheet

There's a lot of dead wood lying around the forests. Millions of acres of it. Not just diseased and aged trees, but the leftovers from logging and timber thinning.

And the waste wood, the wood that nobody wants, is increasingly finding its way into fireplaces, furnaces, stoves, and power plants, reports the National Geographic Society.

Thousands of people are pulling pickup trucks up to the forests, going in with chain saws, and coming out with a winter's worth of logs for fireplaces and woodburning stoves.

The number of tons of wood residues now removed from national forests is more than six times greater than in 1973 when the federal government first opened the woods to the public for free firewood.

Federal Forest Service experts estimate that there is a minimum of 500 million dry tons of residue wood in public and private forests as well as urban land clearing sites that could be turned into energy.

Making use of waste wood is the first step, the experts agree, in looking to wood as an energy source.

Wood now makes up about 2 percent of the nation's fuel supply, and federal experts believe that it could be 7 percent, saving more than 2.5 million barrels of oil a day.

So far, the biggest obstacle to using wood on a large scale is economics--the cost of harvesting the residue wood and transporting it from forest to the furnace. Various researchers are working on the problem and some rudimentary systems are already in use.

Meanwhile, individuals taking advantage of firewood from national and state forests are increasingly installing woodburning stoves in their homes for primary or supplementary heating, cutting down on oil and gas use. The return of the old-fashioned stove accounts for the tremendous demand for the free firewood.

One word of caution before loading up or cutting. Be sure that you have permission. And be sure the wood is dead. ■

Fuel Costs Mounting

Fall 1979 DFSC Fuels Indoctrination Course

Rosemary Lutes
Office of Planning and Management

Members of the Fall '79 DFSC Fuels Indoctrination Class - Photo by Fred Blum

The Fall 1979 DFSC Fuels Indoctrination Course was held at Cameron Station, October 1 thru 5, 1979. The class was composed of 30 students from DFSC Headquarters, the Navy Petroleum Office, U.S. Air Force Detachment 29, and the Army General Materiel and Petroleum Activity at New Cumberland, Pennsylvania. The purpose of this course is to provide personnel with an overview of the fuel industry and Department of Defense petroleum logistics.

Presentations to the class were made by: Robert DiVenuti, American Petroleum Institute; John C. Shea, Exxon Company, USA; Edwin R. Anthony, National Coal Association; CPT Michael T. Murphy, CPT Joseph D. Palatka, and SFC James R. Carstens, U.S. Army Quartermaster School (Petroleum and Field Services Division): MAJ Richard P. Dacey, U.S. Army Energy Office; Stewart H. French, U.S. Air Force Detachment 29; Kathryn F. Munn, Navy Petroleum Office; and Calvin J. Martin, Charles M. Chapman,and LTC James E. Bickford, DFSC Headquarters. We would like to take this opportunity to thank them all for an outstanding job.

Special thanks to Louis Pederson and James Helm for a very interesting tour of the Getty Refinery in Delaware City, Delaware, and to COL Joseph W. Volpe and his staff for an excellent tour of the petroleum laboratory training facilities at the U.S. Army Quartermaster School, Fort Lee, Virginia.

BGEN L. R. Seamon, DFSC Commander, made introductory remarks and CAPT O.W. Hamilton, Jr., Deputy Commander of DFSC, presented the students with certificates of completion at the conclusion of the course. ■

Underground Gasification of Coal Achieved in DOE Project

Energy Insider

The first successful underground gasification of eastern coal has been achieved by a team working for DOE's Morgantown Energy Technology Center at a test site near Pricetown, West Virginia.

The small-scale test in a seam of eastern bituminous coal is currently obtaining a synthetic gas that would be suitable for burning in boilers or for other uses. Approximately one million cubic feet of synthetic gas are currently being produced daily from the test. When the experiment is concluded, about 1,000 tons of coal will have been gasified.

The combustible portion of the gas--primarily a mixture of carbon monoxide, hydrogen and methane--has a heating value in excess of 200 Btu's per cubic foot, about one-fifth that of natural gas.

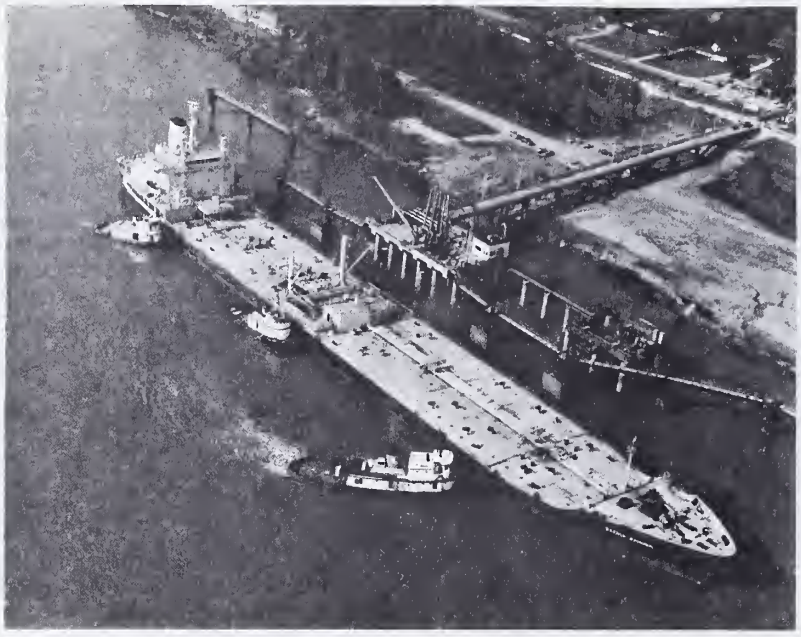
Converting coal to synthetic gas underground eliminates many of the problems associated with mining and may open up coal reserves previously unrecoverable by conventional techniques. Significant progress has been made in gasifying western coal seams, but applying the technique to eastern coals has been a considerable challenge because of the coal's tendency to swell when heated. This swelling shuts off the pathways in the coal seam needed to sustain the flow of air for combustion.

The Pricetown project began early last year when researchers drilled two boreholes 40 feet apart into a 900-foot deep section of the "Pittsburgh" coal seam. In June, the coal was ignited at the base of one borehole and air was injected under high pressure into the other.

The combustion was drawn back to the source of the high-pressure air--much like a smoker inhaling on a cigarette--and a small underground link was created in the seam. This technique, called "reverse combustion," was later used to link an additional 60-foot section of the coal seam.

Last August, once the wells were successfully linked, researchers began injecting lower pressure air into one borehole, and the combustion process, now "pushed" by the air flow, began to trace the linkage back through the coal seam. As the coal burns under properly controlled conditions, it is converted into a combustible synthetic gas which is forced through the seam to the exit borehole and to the surface for analysis. ■

Trial docking at SPR St. James Terminal



The Strategic Petroleum Reserve (SPR) berthed the first crude oil tanker on August 13 at one of the twin docks constructed at the SPR St. James Terminal facility on the Mississippi River. The docking was an operational test of the recently completed docks. Equipment suppliers demonstrated that the loading arms and other dock component systems were functioning properly. No oil was actually discharged.

The U.S. tanker Zapata Ranger (above) was carrying crude oil which was subsequently off-loaded at a nearby oil terminal and pumped through a Department of Energy pipeline to the SPR Bayou Choctaw storage site. The St. James Terminal and the Choctaw site are located in Louisiana near Baton Rouge.

Each of the St. James docks has the capacity of accommodating lightened tankers up to 100,000 tons in size. Each dock is equipped with three 16-inch hydraulic loading arms which allow tankers to be off-loaded at rates up to 60,000 barrels per hour. Ancillary equipment includes quick-release mooring devices and fire protection systems.

Upon berthing, oil will be pumped from tankers through a 42-inch pipeline to six aboveground tanks with a total of two million barrels of storage capacity at the St.James Terminal. The crude oil will then proceed through either a 39-mile DOE pipeline to SPR's Bayou Choctaw storage site or a 69-mile DOE pipeline to the Weeks Island storage site.

In the event of drawdown of the SPR, oil would be pumped out of storage either into the interstate pipeline distribution system (Capline) or back over the St. James docks into tankers for transportation to refineries. ■

SPR Capable of Withdrawing One Million Barrels of Oil a Day

Department of Energy

A system capable of withdrawing up to one million barrels of oil per day from the Strategic Petroleum Reserve (SPR) was completed recently.

The permanent withdrawal system which would be used only on Presidential orders would be able to remove crude oil from the three existing SPR sites--West Hackberry and Bayou Choctaw, both in Louisiana, and Bryan Mound in Texas. The three sites now hold 91.7 million barrels of crude oil in deep underground salt caverns.

Once the President ordered withdrawal from storage, the oil would be transferred through government-owned pipelines to commercial petroleum terminals. It would then be moved by interstate pipeline or by ships to refineries.

Oil from Bayou Choctaw, which is near Baton Rouge, could be delivered by pipeline to the Koch Terminal on the Mississippi River and loaded into vessels, or it could be moved through the Capline interstate pipeline system. West Hackberry oil could be delivered by pipeline to the Sunoco Terminal at Nederland, Texas for distribution by vessels or through the Texoma interstate pipeline. Crude oil from Bryan Mound could be moved by pipeline to the Seaway Terminal facilities at Freeport, Texas, for distribution by tanker or by the Seaway interstate pipeline.

In June of 1979, SPR had available an interim withdrawal system at West Hackberry with a capacity of 125,000 barrels a day.

According to the Department of Energy additional storage sites are in the construction or planning stage to bring the SPR storage capability to 750 million barrels. The overall goal of the program is storage of up to one billion barrels of petroleum. ■

The Hundred Year Old Stripper

Petroleum Today

West Virginia is noted for a number of things--fine glass, the Hatfields and McCoys, coal,fishing, white water canoeing, Mothers Day, and oil.

Oil?

Years before most states even dreamed of oil, the Rathbone family of Burning Springs, West Virginia, drilled for and found oil. That was in 1859, only two months after Drake drilled his well--the first in the United States in--neighboring Pennsylvania.

If you go by the number of producing wells drilled, West Virginia is right up there among the top ten, with more than 77,000 drilled during the past century. And 13,500 of them are still producing oil or natural gas. Every barrel these wells produce helps in our nation's struggle for energy independence.

Why is it, then, that you don't hear more about West Virginia's oil? Because all but a few of the 13,500 wells are "strippers."

A stripper well is a low productivity, marginally economic well. It can produce just enough oil to remain above the break-even point. By definition, a stripper well averages 10 barrels of oil per day or less. The stripper wells of West Virginia average one-half barrel of oil per day each. But together they produce 2.4 million barrels of oil a year.

Throughout the United States, stripper wells account for more than 13 percent of total domestic production--pumping out a steady million barrels a day total, 365 days a year.

The stripper well is the "last stand" so far as an active well is concerned. Sooner or later, even a well that once produced 1,000 barrels a day or more, like the Rathbone well, can decline to the stripper level. Some stripper wells may produce only a fraction of a barrel daily. Yet enough crude oil may slowly seep into the well bore from the surrounding reservior rock to justify continued pumping. West Virginia's wells, for example, yield about 21 gallons a day on the average, worth about $5 to $6. A stripper well may be pumped only one or two days a week, but even this represents oil that would be lost if the well were plugged and abandoned.

A typical stripper well operator is often a local resident, a "Ma and Pa" enterprise that bought the stripper lease from a major company. They operate the leases for as long as there is any economic life left in the well.

A senator from Oklahoma once estimated that a 25 cent increase in the price of a barrel of crude oil in 1972 would have kept 15,000 wells in production that were plugged and abandoned--because the operators were losing money while producing oil. Had the wells

continued, they would have produced an extra 235 million barrels of oil during their extended lives, the equivalent of two major oil fields.

During World War II, a subsidy program for stripper wells went into effect. Payments ranged from 20 cents per barrel up to 75 cents. All wells in the four states of Pennsylvania, New York, Ohio, and West Virginia received 75 cents for each barrel of oil produced. During the two year emergency period, this incentive resulted in an extra 177 million barrels of oil for the war effort.

Economics dictate whether or not stripper wells will continue to produce. Until July 1974 when controls were lifted from stripper wells the price of oil was held at $5.25 a barrel. During that time, the Federal Energy Administration got a neatly typed letter from an Illinois stripper well operator. "One field in particular comes to mind," he wrote. "It is likely that it will be abandoned next year unless the wellhead price of crude increases substantially. This particular field has produced hundreds of thousands of barrels of oil. If the price of crude were to increase 100 percent (as have the costs of producing it over the past 15 years) we could continue to operate these wells at a profit. As it is, they will probably be plugged even though an additional 100,000 barrels of oil could, perhaps, be produced."

This kind of reasoning brought about the change in price, and stripper oil now goes for the market-clearing price.

Economics also determine the estimates of reserves that stripper wells can eventually bring to the surface. With the rise in wellhead value of stripper production that has occurred since stripper wells were free from price controls, the reserve figure may increase by as much as 50 percent. This would yield a total of reserves almost as large as the proven reserves of the North Slope of Alaska.

The improved price for stripper production has already showed up in renewed activity in stripper areas--cleanouts, workover, new drilling, and general rejuvenation of properties. And the increase in the number of wells abandoned slacked off--the smallest increase in well plugged for any of the past five years.

Nevertheless, there must come a day when a well reaches a break-even point. As it becomes evident that the well can only be operated at a loss, the prudent operator reluctantly gives plugging orders.

When a well is plugged, it may never produce again. ■

Big Northwest Coal Field Studied for Gasification

Energy Insider

The largest coal field in the state of Washington, the Centralia-Chehalis Coal District, is being studied by DOE scientists seeking a Washington site for a proposed commercial application of underground coal gasification.

The district, a 570-square-mile area in west-central Washington, contains about 3.3 billion tons of subbituminous coal. More than half of this reserve cannot be easily reached using traditional surface or underground mining techniques. Significant portions, however, may be appropriate for underground gasification.

The new $800,000 project is designed to select a site and develop a relatively simple gasification experiment for the area. Sandia Laboratories of Albuquerque is technical manager for the project. DOE's Laramie Energy Technology Center and Lawrence Livermore Laboratory,both DOE facilities, will participate in the project along with state agencies, universities and industrial contractors.

"The type of area we are looking for should contain at least 50 million tons of subbituminous coal in one parcel or several adjacent parcels," says Stan Love of Sandia. "Coal seams at least six feet thick should be sandwiched between relatively impermeable strata twice as thick as the seams. The seams should be between 300 and 1,000 feet deep and in zones with fairly simple geology and no major faults. The area should be near market centers but away from populated areas."

Underground gasification consists of drilling holes into a coal seam, establishing permeability in the seam between these holes or wells, igniting the seam, injecting air or oxygen to sustain gasification and withdrawing gas from neighboring wells. Because the energy is extracted without mining, most ash and sulfur contaminants remain underground.

Product gas can then be combusted on site to generate electricity, be used as a chemical feedstock or possibly upgraded to synthetic natural gas.

During the next year,the Washington site will be subjected to geophysical, geologic,hydrogeologic and environmental studies which will involve drilling at least 15 boreholes, some as deep as 1,000 feet. The studies will determine the coal's rank, grade, coking quality, swelling index and porosity--all chacteristics needed in assessing how well it will gasify. ■

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